Several ESTO Technologies To Support 2010 GRIP Campaign

For six weeks beginning August 15, 2010, NASA's Genesis and Rapid Intensification Process (GRIP) field campaign will send three aircraft on a series of flights to study tropical cyclones and the processes that lead to the creation and intensification of hurricanes. A Global Hawk UAV, a DC-8 and a WB-57F will carry several new instruments – from an advanced microwave sounder to drop-sondes – that will take a range of pressure, wind, water, aerosol, and temperature measurements and provide scientists with an unprecedented, sustained look at hurricane formation and development.

Four of these instruments include technology investments made over the past decade by the NASA Earth Science Technology Office (ESTO):

- The **Doppler Aerosol WiNd lidar (DAWN)** is a 2-micron doppler lidar that can take vertical profiles of vectored horizontal winds. DAWN will fly on the DC-8 aircraft. *(Principal Investigator: Michael Kavaya, Langley Research Center)*

- The **Airborne Second Generation Precipitation Radar (APR-2)**, which will also fly on the DC-8, is an advanced radar system that obtained the first-ever simultaneous measurements of rain intensity and fall velocity profiles during the 4th Convection and Moisture Experiment (CAMEX-4) in 2001. *(Principal Investigator: Eastwood Im, Jet Propulsion Lab)*

- The **High Altitude MMIC Sounding Radiometer (HAMSR)**, which will fly on the Global Hawk UAV, is a microwave atmospheric sounder that provides measurements that can be used to infer the 3-D distribution of temperature, water vapor, and liquid water in the atmosphere, even in the presence of clouds. *(Principal Investigator: Bjorn Lambrigtsen, Jet Propulsion Lab)*

- **The High-Altitude Imaging Wind and Rain Airborne Profiler (HIWRAP)**, a current ESTO investment, is a dual-frequency doppler radar capable of measuring tropospheric winds within precipitation regions as well as ocean surface winds in rain-free to light rain regions. HIWRAP will also fly on the Global Hawk. *(Principal Investigator: Gerald Heymsfield, Goddard Space Flight Center)*

A fifth instrument in the GRIP campaign incorporates a ground-breaking ESTO technology within its subsystem: the Hurricane Imaging Radiometer (HIRAD) instrument on board the WB-57 includes the **Agile Digital Detector (ADD) for Radio Frequency Interference (RFI) Detection and Mitigation** system *(Principal Investigator: Chris Ruf, University of Michigan).* The ADD can produce clearer microwave measurements, particularly over populated areas where wireless communications tend to crowd the spectrum.

GRIP is also utilizing a novel mission-monitoring tool funded and developed by ESTO. The **Real Time Mission Monitor**, or RTMM *(Principal Investigator: Michael Goodman, Marshall Space Flight Center)*, is a situational awareness tool that integrates satellite, airborne and surface data sets; weather information; model and forecast outputs; and vehicle state data (e.g., aircraft navigation, satellite tracks and instrument field-of-views) for field experiment management. RTMM will optimize science and logistic decision-making for GRIP by presenting timely data and visualizations to improve real-time situational awareness of the assets.

Visit http://grip.nsstc.nasa.gov to learn more about the GRIP campaign. For more information on emerging technologies for Earth science, visit the ESTO website at: http://esto.nasa.gov